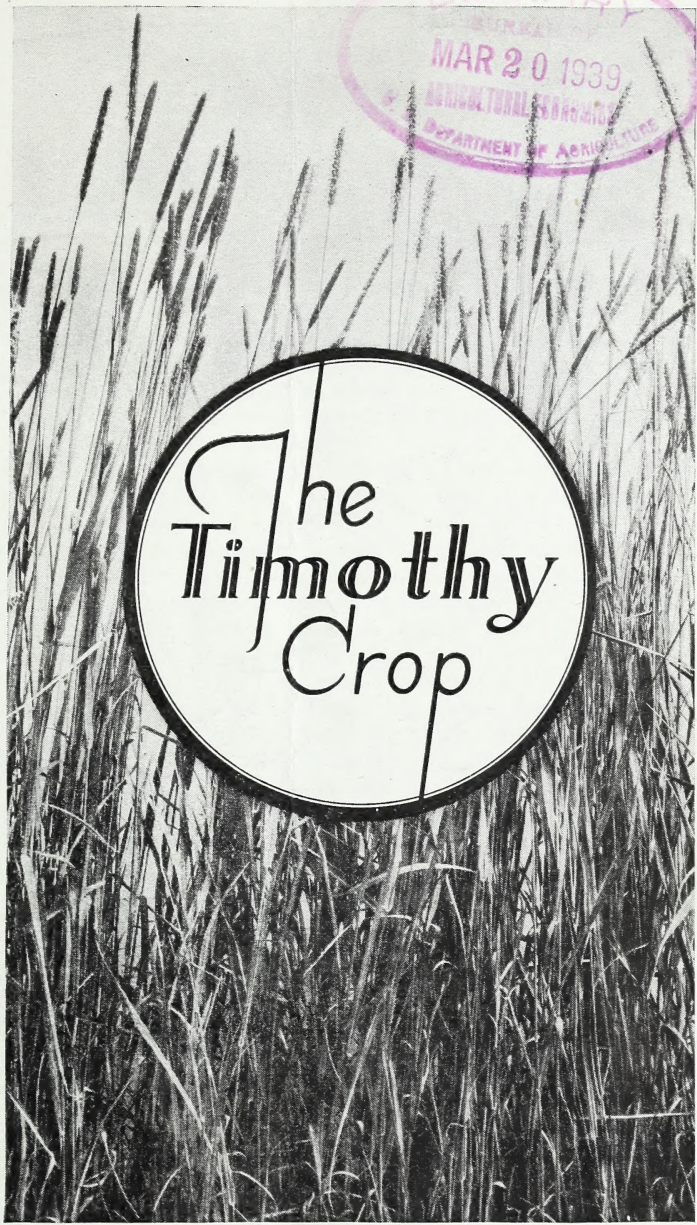
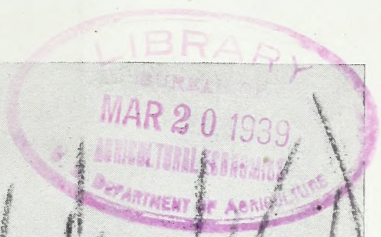


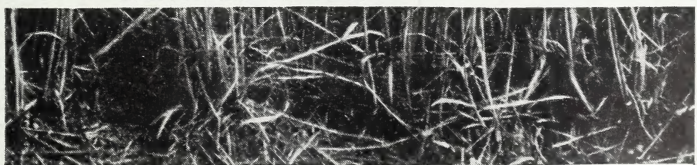
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THE TIMOTHY CROP

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Timothy is well adapted to the cool, humid climate of the Northeastern and North Central States and also to the mountain valleys of the Rocky Mountains and the coastal region of the Pacific Northwest. It grows better on clay loams than on the lighter-textured sandy soils. Throughout the area to which it is adapted, it is more extensively grown for hay, either alone or in mixture with clover or alfalfa, than all other grasses combined.

In 1909, 1919, and 1929, according to the United States census reports, timothy, alone or in mixture with clover, was grown in the United States on 34,228,000, 30,290,000, and 25,547,000 acres, respectively. This decreasing acreage was due in part to the reduced numbers of horses and consequent loss of a large proportion of the city market for hay and in part to changing farm practices. Another factor was the decreasing acreage in farm land in some parts of the United States where timothy is an important crop, as timothy acreage was planted to other crops. In the New England States, where the acreage classified as "all land in farms" decreased from 19,714,000 in 1909 to 14,283,000 in 1929, there was a slight percentage of increase in the proportion of all farm land in timothy or timothy and clover—from 11.9 percent in 1909 to 12.3 percent in 1929—although there was an actual decrease of over 500,000 acres of timothy. Most of the timothy now produced is fed on the farms.

Seeding Timothy

Timothy may be sown either with the grass-seeding attachment on a grain drill, or with a hand seeder. The seed should be covered not more than half an inch. If sown on the surface of a loose, recently tilled soil, usually the first rainfall will cover the seed so that it will germinate. When sown very early in the spring on fields of winter grain, the alternate freezing and thawing of the soil helps cover the seed so that germination and growth can take place.

When timothy is seeded alone or with winter wheat or some other fall-sown cereal, it should be seeded in the fall, since seedlings started at this time are less likely to be injured by dry weather during late spring or early summer than are seedlings from spring seedings. Experimental work and experience have shown that much less seed is required for fall than for spring seeding. From 3 to 5 pounds per acre is recommended for the former, while 10 pounds is recommended for spring seeding. If clovers or alfalfa are to be seeded as a mixture with the timothy, they should be broadcast on the surface of the soil in the early spring. Fall seedings of the legumes may be made in

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the southern part of the timothy belt, provided they are seeded sufficiently early to become established before cold weather.

When seeded with timothy, red clover or mammoth clover should be seeded at the rate of 4 to 6 pounds per acre; alsike clover, 2 to 3 pounds; and alfalfa, 6 to 8 pounds. When all three legumes are sown in mixture with timothy, the following rates are recommended: Red clover, 2 to 4 pounds per acre; alsike clover, 2 pounds; and alfalfa, 4 to 6 pounds.

Timothy in Mixtures

In the New England States and in some other parts of the timothy-growing area, redtop can be seeded in mixture with timothy, and on heavy, wet soils this is a good practice. Timothy is very commonly sown with clover—medium red, mammoth, or alsike—in order to get a hay with higher protein content and to better maintain soil productivity; on soils where the clover is subject to winter-killing, both alsike and medium red should be sown.

Wherever alfalfa can be made to succeed it can be sown in mixture with timothy and clover. After the clover has disappeared from such a mixture, the meadow will continue to produce crops of timothy and alfalfa. When alfalfa is thus grown in mixture with timothy or other grass, it is not as subject to winter injury as when growing alone. This is probably due to the mulchlike effect of the grass roots and leaves. Alfalfa may be grown successfully in mixture with grass when it is not practical to grow it alone, provided the soil has been properly prepared by draining and liming and in other ways.

Fertilization of the Meadows

Timothy quickly responds to applications of nitrogen in such carriers of this element as nitrate of soda, sulphate of ammonia, and others. In meadows where fertilization is to be continued for 2 years or more, the efficiency of the nitrogen carrier is increased by applying it in combination with superphosphate.

Superphosphate and potash, without nitrogen, usually affect the growth of timothy plants but little. On soils deficient in these elements these fertilizers encourage the growth of volunteer clover plants. Timothy in association with a legume grows more vigorously than alone. In this somewhat indirect way the application of these mineral fertilizers may bring about an increase in the hay crop in timothy meadows.

Results obtained from experiments conducted in Ohio indicate that applications of soluble nitrogenous fertilizers are most effective in increasing yields when made at rates not exceeding 200 or 300 pounds per acre of nitrate of soda or its equivalent. Applications of nitrogen on timothy made about April 15 have produced somewhat larger average yields than those made earlier or later. Where cyanamide is used, it should be applied about a month earlier than the optimum date for the more soluble nitrogenous fertilizers.

In experiments in which farm manure has been applied on a preceding corn crop, the yields both of mixed timothy and clover in the first year's hay crop and of timothy in the second year's hay crop have been increased substantially.

Quality of the Hay as Affected by the Stage of Cutting

A change in the quality of hay occurs as the season advances. The percentages of the most valuable constituents, including the two carbohydrates classified as the nitrogen-free extract and the fat, and also the protein, gradually decrease, while the less digestible and less valuable crude fiber increases.

Timothy hay contains all of the known vitamins, with the exception of C. Of these vitamins, A, present in hay in the form of carotene, is of special importance in the feeding of roughage-consuming animals. It, like most of the vitamins, is present in greater quantities in early cut than in late cut and in well cured than in poorly cured hay.

Timothy, like other kinds of hay, is graded largely on the basis of its color. At successively later stages of development, as increasing numbers of green leaves, stems, and heads change to straw color or become brown, the United States grades which may be assigned to the hay gradually become lower.

Time of Cutting

After timothy has just passed the stage of full bloom there is only a very slight gain in yield of hay; even after the time of early bloom, the gain is not very great. Since there is a constant decrease in the percentage of protein, there is consequently a gradual decrease in the yield of protein per acre after it is in early bloom. The greatest value per acre, as represented by the largest yield consistent with a high quality of hay, is obtained by cutting when the timothy is in early bloom, and cutting at this stage is recommended.

On farms where there is a large acreage of timothy and it is not possible to harvest the entire crop at the proper time, it is better to harvest some of the crop a little too early rather than too late. It may even prove practical to grow on the same farm an early, a medium, and a late variety of timothy (fig. 1), in order to extend the time during which a high quality of hay may be obtained.

In the timothy-growing areas of the United States much hay is not cut until the seed is nearly mature. It may be that when timothy is harvested at this time rather than at an earlier date, there is less competition with other farm work, such as cultivating corn, harvesting wheat, or cutting clover hay. However, this delay occasions a serious loss in the quality and value of the hay.

Seed Production

Any timothy meadow that will produce a good crop of clean timothy hay may be harvested for seed. Timothy is most commonly harvested with a grain binder. After the bundles have become well dried, the seed is threshed with an ordinary threshing machine, with the speed of the cylinder and the fans reduced. More detailed discussion of timothy-seed production is presented in United States Department of Agriculture Leaflet 115, Timothy Seed Production.

Improved Varieties of Timothy

Until within quite recent years, there was no seed available of any other kind or variety of timothy than the ordinary unimproved strain.

One early strain, Shelby, has been grown for many years in the vicinity of Shelbyville, in southern Indiana, but very little of this seed has been marketed outside of the limited area within which it has been grown.

The selections and improved varieties of timothy that have been developed in the United States up to this time are of the hay type (fig. 2). Seed of one early variety, Marietta, is now becoming available. One late variety, Huron, is being grown on a considerable acreage, both in meadows and pastures, in the Pacific Northwest. The variety, Cornell 4059, developed by the Cornell University



FIGURE 1.—Ordinary timothy (left) and Huron timothy, about 6 days later than ordinary (right). The season during which timothy hay may be harvested in good condition may be extended by growing two such varieties.

Agricultural Experiment Station, is also somewhat later than ordinary timothy.

In the latitude of southern Ohio, or farther south, late varieties of timothy do not grow well; only early varieties or ordinary timothy can be grown successfully. In the latitude of northern Ohio both early and late varieties may be grown.

Utilization and Feeding Value of Hay and Pasturage

As compared with clover, alfalfa, or hay made from any other legume, timothy, a nonlegume, is relatively low in protein and also in minerals, especially calcium or lime. However, the deficiency in protein may be corrected by the use in the ration of a somewhat larger amount of some high-protein concentrate, and the deficiency in calcium may be corrected by the addition of a small amount of a high-calcium mineral, like limestone flour. If fed in this way, and if the

timothy has been cut at the proper time and cured under favorable conditions, very satisfactory results may be obtained in feeding livestock.

Timothy is considered the standard roughage for horses and mules and is especially valuable when free from dust. The clear timothy hay is preferable for light horses, work horses, and mules, while a mixture with clover when cut early is a more satisfactory roughage for dairy and beef cattle.



FIGURE 2.—Early timothy (left), all plants are in full bloom; late timothy (right), none of the plants are yet in full bloom.

Timothy ranks high among the grasses in respect to its palatability. Tests show that, if various kinds of grasses are available, stock will usually graze the timothy before redtop, orchard grass, or even Kentucky bluegrass. Where timothy grows well, it is commonly included in the mixture of grasses and legumes sown in permanent pastures. For a time the timothy may constitute a large proportion of the pasturage, but as the pasture becomes older, the timothy tends to produce less and less, and to be gradually replaced by some other grass, such as redtop, colonial bent, Canada bluegrass, Kentucky bluegrass, or some other species that is better adapted than the timothy for growing in mixture.

Timothy for Silage

The use of timothy for silage is of very recent origin and as yet is very limited. In order that it may make feed of a high quality, timothy silage, unlike corn silage, must have mixed with it either a small proportion of some acid or, preferably, some form of sugar, usually molasses. If the silage is made under proper conditions, from 1 to 2 percent of molasses is sufficient. The best quality of silage may be obtained if the timothy contains from 30 to 40 percent of dry matter when it is placed in the silo.

The Effect of Timothy in Rotations

When an unfertilized timothy sod is plowed, the following crops are considerably smaller than when a leguminous crop is plowed under. This decreased yield following timothy is now known to be due largely to the deficiency of available nitrates in soil that has produced a grass crop. The bacteria and other soil organisms that cause the decay of roots, stubble, or other plant parts, and transform them into humus, require for their own growth activities such a large part of the available nitrogen that an insufficient amount remains for the growth of the succeeding crop. If a nitrogen-carrying fertilizer is applied to land that has produced timothy, the yields of the cereal crops produced in the timothy rotation and in the clover rotation become more nearly alike.

Erosion

There is much less erosion on soil producing timothy or other grass than on soil producing grain or cultivated crops, and in crops following timothy the tendency to erosion is greatly reduced by reason of the very numerous fibrous roots of the timothy plant that have been added to the soil.

